DOCUMENT RESUME

ED 293 718 SE 049 094

AUTHOR	Disinger, John F.
TITLE	Environmental Education in K-12 Curricula. ERIC/SMEAC Environmental Information Bulletin No. 2, 1987.
INSTITUTION	ERIC Clearinghouse for Science, Mathematics, and Environmental Education, Columbus, Ohio.
SPONS AGENCY	Office of Educational Research and Improvement (ED), Washington, DC.
PUB DATE	87
CONTRACT	400-86-0016
NOTE	10p.
AVAILABLE FROM	SMEAC Information Reference Center, The Ohio State University, 1200 Chambers Rd., 3rd Floor, Columbus, OH 43212 ($1.00).
PUB TYPE	Reports - Descriptive (141) -- Information Analyses - ERIC Information Analysis Products (071)
EDRS PRICE	MF01/PC01 Plus Postage.
DESCRIPTORS	Curriculum Design; *Curriculum Development; Elementary Secondary Education; *Environmental Education; *Interdisciplinary Approach; International Cooperation; *National Surveys; *Professional Associations; Science and Society; *State Departments of Education; Teaching Methods; Theory Practice Relationship
IDENTIFIERS	*Environmental Education Research

ABSTRACT

During 1987 the ERIC Clearinghouse for Science, Mathematics, and Environmental Education (ERIC/SMEAC) conducted a survey of the state education agencies, asking respondents to summarize their perceptions as to how schools include environmental topics in their curricula by responding to a questionnaire. Also requested was information concerning extent of inclusion, forms of environmental education commonly employed, and agency policy with respect to inclusion. During October 1987, ERIC/SMEAC personnel organized and presented a symposium, "Environmental Education in School Curricula: (How) Does it Fit?" at the annual conference of the North American Association for Environmental Education (NAEE) in Quebec City. Fourteen invited participants (ten from the United States, three from Canada, one from Australia) presented position statements during a day-long session. This information bulletin provides summaries of both the survey and the symposium. Both the survey and the symposium offer ample evidence that the posed question of how environmental education "fits" into school curricula is more complex than it might appear; a range of possible positions and mechanisms are possible. The evidence above and elsewhere suggests that infusion is the more popular method. There is greater likelihood of finding space for environmental topics in school curricula if they can be associated with existing curricula, rather than creating new separate courses. Excerpts of both the survey respondents' comments and the 14 symposium papers are included in this document. (TW)

ED293718

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Robert W Howe

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

X This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

ENVIRONMENTAL EDUCATION IN K-12 CURRICULA

ERIC Clearinghouse for Science, Mathematics and Environmental Education

Information Bulletin No. 2, 1987

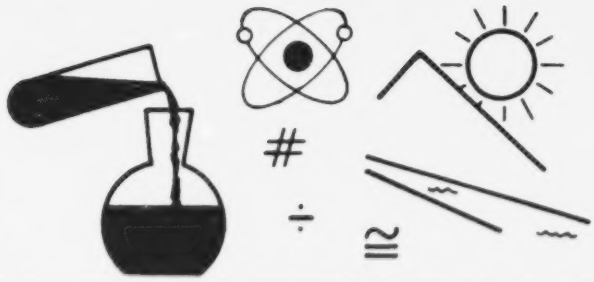
Prepared by:

John F. Disinger

Associate Director for Environmental Education, ERIC/SMEAC

SE 049 094

ERIC
Clearinghouse
for Science, Mathematics
and Environmental Education



Information Bulletin No. 2, 1987

ENVIRONMENTAL EDUCATION IN K-12 CURRICULA

The practical problem of finding ways to incorporate environmental considerations within K-12 school curricula is a continuing one. Because environmental topics have not traditionally had a curricular home of their own, individuals wishing to include such topics, or to promote their inclusion, have been faced with the necessity of identifying appropriate niches. Doing so presents the same challenges for those interested in environment as a part of school curricula as it does for others promoting the inclusion of other non-traditional topics.

The rationale for this information bulletin is based on acceptance of the assumption that environmental topics deserve inclusion in K-12 curricula in meaningful manners. It reports on current practice as described by state education agency professional staff with responsibilities for environmental education, then considers several possible alternatives for inclusion as they are currently practiced or proposed.

During 1987, the ERIC Clearinghouse for Science, Mathematics, and Environmental Education (ERIC/SMEAC) conducted a survey of the state education agencies, asking respondents to summarize their perceptions as to how schools include environmental topics in their curricula by responding to a series of questions developed to elicit such information. Also requested was information concerning extent of inclusion, forms of environmental education commonly employed, and agency policy with respect to inclusion. The rationale for using this strategy to seek this information is based on the Constitutional responsibility of the states for management and leadership in formal education.

During October 1987, ERIC/SMEAC personnel organized and presented a symposium, "Environmental Education in School Curricula: (How) Does It Fit?" at the annual conference of the North American Association for Environmental Education (NAEE) in Quebec City. Fourteen invited participants (10 from the United States, 3 from Canada, 1 from Australia) presented position statements during a day-long session.

A single volume (Disinger, 1987) reporting the results of the survey and containing and summarizing the symposium papers is currently in press. This information bulletin provides summaries of both the survey and the symposium.

Format of the Survey

Responses were received from representatives of 40 of the 50 state education agencies (80%). Parallel sets of questions were directed toward practice in environmental eduation and/or environmental topics in elementary schools and in secondary schools. An additional question dealt with agency policy with respect to inclusion of environmental topics.

Elementary Schools

One question asked, "To what extent is environmental education included in the curricula of elementary schools in your state?" A response was requested in terms of percentages of schools including environmental education in some manner, with five listed response categories: 0-20%, 21-40%, 41-60%, and 81-100%. Of the 38 responses to this question, 17 (44.7%) indicated the highest percentages, while the others were distributed more or less evenly across the remainder of the spectrum of possible responses. Of them, six (15.8%) indicated the lowest frequencies. Nine respondents (22.5%) indicated that their responses were based on data, while the remainder either indicated use of estimates or did not respond to the question. Those indicating data based responses frequently cited state-level requirements for inclusion of environmental topics as evidence that they were in fact included, and did not cite direct evidence of actual inclusion.

Only one state (2.5%) reported that environmental education was most commonly considered a separate subject in elementary schools. Infusion of environmental topics into other curricular areas was noted as a common practice in 39 of the 40 responding states (97.5%); four of those states also indicated that environment was treated as a separate subject on occasion. Thus, in five states (12.5%) environmental education was treated as a separate subject frequently enough to warrant mention by respondents to this survey.

Another question was concerned with forms of environmental education commonly employed in elementary schools. *Nature study* was cited by 33 of 39 respondents (94.6%). *Energy education* (by 69.2%), *outdoor education* (by 66.7%), and *conservation education* (by 66.7%) also were frequently noted. Relatively fewer respondents noted emphasis on *marine/aquatic education* (41.0%), while emphasis on either *science/society/technology/environment education* (20.5%) or on *population education* (17.9%) was still less common.

Secondary Schools

Another question asked, "To what extent is environmental education included in the curricula of secondary schools in your state?" A response was requested in terms of percentages of schools including environmental education in some manner, with five listed response categories: 0-20%, 21-40%, 41-60%, 61-80%, and 81-100%. Of the 38 responses to this question, 18 (47.4%) indicated the two highest percentages, while 18 others (47.4%) noted the two lowest percentages. Only 9 (23.7%) indicated that their responses were based on data; the others either

indicated use of estimates or did not respond to the question.

Infusion of environmental topics into other curricular areas was noted as a prevalent mechanism of inclusion in secondary schools by 36 of the 40 respondents (90.0%) to the questionnaire item dealing with format of presentation. Seven (17.5%) indicated that both "infusion" and "separate subject" were common in the secondary schools of their state, while 11 (27.5%) indicated that presentation as a separate subject was the more common practice.

Of the 36 who mentioned infusion as a common practice, 28 (77.8%) specified science or biology as at least one of the curricular areas in which environmental topics were infused; of them, 16 (57.1%) indicated only science or biology. Nine of the 36 (25.0%) specified social studies as a subject area into which environmental topics were infused; each of those nine also noted science as a host subject. In two cases (Ohio and Wisconsin), a number of curricular areas were noted as hosts. Alaska studies was identified as a host area in that state's secondary schools, and a science/technology/society curriculum by the Utah respondent. Seven states indicated infusion as the typical practice, but did not identify host subjects.

The two most common forms of environmental education identified in secondary schools were *energy education* (by 31 of 39 respondents, or 79.5%) and *science/society/technology/environment education* (by 30 of 39 respondents, or 76.9%). *Conservation education* was noted by 21 respondents (53.8%), and *marine/aquatic education* by 20 (51.3%). *Outdoor education* and *population education* were each noted by 17 respondents (43.6%). Fifteen (38.5%) indicated that *nature study* was a common emphasis in the secondary schools of their states.

One state (Pennsylvania) requires an environmental course of all high school students, while three others (Indiana, New York, and Washington) mandate the availability, as electives, of environmental courses in secondary schools.

Comparisons between Elementary and Secondary Schools

In both elementary and secondary schools, reported percentages of inclusion of environmental topics in curricula are bi-modal; that is, in neither situation are the reported percentages clustered in the middle. The reported percentages suggest that environmental education is relatively more common in elementary schools than in secondary schools, with 57.9% of the states reporting elementary schools as being in the 61%-plus category, as compared to 42.1% of the states reporting similar percentages for secondary schools.

The more traditional forms of environmental education—*nature study, outdoor education,* and *conservation education*—were more commonly noted for elementary schools than for secondary schools. *Nature study* leads the rankings in elementary schools, being listed on 84.6% of the response forms, but is at the bottom of the secondary school rankings at 38.5%. *Outdoor education* shows a similar decline (from 66.7% to 43.6%), though not as dramatic. *Conservation education* also shows a decrease from elementary to secondary levels, though of a still lesser magnitude (from 66.7% to 53.8%).

Energy education was reported as a commonly employed form of environmental education in elementary schools (69.2%), and even more so in secondary schools, where it achieved the highest level of response of all forms listed (79.5%). When looked at across the K-12 board, energy education appears to be the most commonly employed approach to environmental education in the United States.

Marine/aquatic education was more frequently listed as a common form of environmental education in secondary schools (51.3%) than in elementary schools (41.0%); it appears that proximity to a seacoast or to the Great Lakes is a dominating factor as to whether or not it was listed at either level.

Population education was much more frequently listed as an area of emphasis in secondary schools (43.6%) than in elementary schools (17.9%). However, responses to this survey indicated that the greatest contrast between elementary and secondary schools with respect to commonly employed forms of environmental education is in the *science/society/technology/environment* area. For elementary schools, S/S/T/E was noted by 20.5% of respondents, while 76.9% listed it as a common form of environmental education in secondary schools. Even though they listed it as a commonly employed form, two respondents suggested that this area is more appropriately referred to as *science/technology/society education* (S/T/S), the more frequently used term in professional education circles. The S/S/T/E term was used in conducting this survey because of the centrality to and preponderance of environmental topics in most, if not all, published S/T/S rationales and curricula.

State Education Agency Policies

Eight of the 40 respondents (20.0%) indicated "yes" in response to the question, Does your agency have a policy, formal or informal, with respect to the scheduling in either or both elementary and secondary schools? In each case, "infusion" was identified as the required mechanism. Of the 32 who indicated that their states had no stated policy in this regard, 6 (15.0%) specified that environmental topics must be included in school curricula, though manner of inclusion remains a local choice. An additional 10 states (25.0%) recommend inclusion of environmental topics in K-12 curricula; generally, the statements of respondents suggest that infusion is the probable mechanism. The remaining 16 respondents (40.0%) indicated that their states had no policies in this area.

Respondents' Comments

The open-ended nature of the survey instrument provided many opportunities for individual comments by respondents, some of which are of particular interest. Among them are:

Peggy Cowan, *Alaska Department of Education:* Some environmental education that is going on is not intentional. Many local studies or native studies units are environmental education approaches, without the teacher purposely choosing to do environmental education . . . Because of the settings of schools and communities, environmental education activities are often used as a doorway to traditional subjects and instruction in Alaska . . . Many of the quality programs and activities being used in Alaskan schools are available because of the cooperation of agencies, universities, and non-profit organizations . . . Secondary science and social studies curricula and texts often provide barriers to integrated teaching and environmental education, in Alaska as elsewhere . . .

Bill Fulton, *Arkansas Department of Education:* All (Arkansas) state course content guides contain EE skills. Schools are required to use the state course content guides . . .

Rudolph J. H. Schafer, *California Department of Education:* Environmental education is required, by the State Education Code, in all appropriate grade levels and subject matter fields, with emphasis in the areas of science and social studies. We assume that all local education agencies include the required emphasis. The state Science Framework Addendum and other recommended publications emphasize environmental concepts. The state testing program includes questions relating to EE, and local agencies structure programs to conform to this program . . . There is pressure from the state level to teach appropriate EE concepts as a part of the K-12 instructional

program . . . We are perhaps unique in that we have discretionary funds supplied through the sale of personalized license plates which permit us to fund a great many local programs which encourage innovative and exploratory programs . . .

John C. Cairns, *Delaware Department of Public Instruction:* (Our agency) has no policy with respect to the scheduling of environmental education, but we are trying to get one.

Martha M. Green, Linda K. Harageones, Jack M. Hopper, *Florida Department of Education:* Environmental education topics are infused into curriculum frameworks in science (6-12). There are 18,000 students, 9-12, enrolled in Ecology or Environmental Education . . . The Florida Council on Comprehensive Environmental Education has recommended that the Environmental Education Policy Advisory Committee adopt a policy that environmental education be included in all subject area curricula, pre-K-12. Efforts are underway to fund such curriculum development.

Gwen Hutcheson, *Georgia Department of Education:* Environmental topics can be found throughout the curriculum in both science and social studies . . . in an infused model . . . The science and social studies coordinators have been very much aware of the importance of environmental issues and the need to be sure that these topics are infused throughout the curriculum at appropriate places in science and social studies. We have been part of a ten-state consortium coordinated by the Social Science Education Consortium, Inc. in Boulder, Colorado, to develop curriculum for Science/Technology/Society for K-12 grade levels. We have served on state committees cooperating with environmental and conservation groups.

Katherine T. Kawaguchi, *Hawaii Department of Education:* Our state has a strong marine education and outdoor education program for the elementary schools. However, the secondary curricula and studies dealing with the unique terrestrial ecosystems of our islands still need to be addressed . . .

Richard Kay, *Idaho Department of Education:* There are a few separate (environmental) subject courses (in secondary schools), but it does not appear to be a trend . . . Our agency has an informal policy encouraging infusion of EE in all schools, in all subjects . . . We attempt to give every teacher the opportunity to get additional training in EE to encourage the infusion of topics in their classes. Summer workshops and inservice courses we use include Project WILD, Project Learning Tree, Investigating Your Environment, the CLASS Project, etc.

Don Roderick, *Illinois State Board of Education:* State law requires that EE be taught; however, it may be included with other subject material . . . "Conservation Education" is often the term used, in place of "Environmental Education" . . . Some high schools have EE courses, or include it as a basis for a science offering . . . Specific topics should be identified that give some operational definition of EE. Everything could be considered EE, if one wished to argue the topic.

Joe E. Wright, *Indiana Department of Education:* Although we stress infusion, we have state approval for three courses at the high school level: Environmental Science, Environmental Studies, and Energy Resources. High school teachers have the option of teaching these, rather than infusing environmental education into their other curricula. The Environmental Science and/or the Energy Resource courses can count as one of the two required science courses which students need to graduate . . . We also provide special funding to teachers/schools to design summer environmental science programs; we pay 100% of teacher salaries . . . All classroom teachers (K-6) are required to teach science, and EE has been infused at all grade levels.

Duane Toomsen, *Iowa Department of Education:* Although state law requires "Conservation of Natural Resources and Environmental Awareness" be taught as a part of science, grades 1-12, I am convinced it doesn't always happen . . . We encourage infusion of OUTLOOK, Project WILD, ENERGY, and Project Learning Tree in existing (elementary) curricula . . . One quarter of our high schools offer a course called "environmental problems," or something similar in name. However, all students are not required to take this course where offered . . . Many biology teachers and geology teachers infuse EE. Energy is an important part of science, home economics, industrial technology, and social studies. We also have materials for creative and language arts, and mathematics . . . The teaching of EE varies considerably from one school to another because of teacher interest and training. Our inservice efforts attempt to reach 10% of our teaching population annually . . . County conservation board naturalists do an excellent job as resource people, to provide for some teacher's lack of training. They serve primarily as resource people to the students, and are used extensively.

Ramona J. Anshutz, *Kansas Department of Education:* We have a very strong Kansas Advisory Council for Environmental Education (KACEE) . . .

Ann Seppenfield, *Kentucky Department of Education:* (Elementary) teachers in Kentucky must integrate EE into their regular courses of study, because they are required to teach a specific number of minutes per subject. The most common form of EE is probably S/S/T/E education, and it is probably taught using science textbooks. Some of the high schools are participating in a program called Water Watch, which encourages local communities to learn about their water resources and to learn about the quality of the water. Field manuals are provided to Water Watch groups, and resource people from the Kentucky Division of Water (which sponsors the program) provide technical assistance . . . Some schools do offer special elective courses in EE through the science program . . . Until 1984, there was an environmental education mandate that required EE, grades K-12, in the schools of the Commonwealth. EE is no longer required, but is included by schools as an option. We have an insert on EE in the state's *Program of Studies*, curriculum guidelines for all public schools . . . Kentucky has pockets of EE programs that involve entire school systems; some school systems, however, do little or nothing . . .

James Barr, *Louisiana Department of Education:* Secondary curriculum guides have EE integrated into objectives at both cognitive and affective levels . . . (Our agency) currently has no policy with respect to the scheduling of EE. We are anticipating state legislation to promote environmental education, next year.

Thomas Keller, *Maine Department of Education:* As part of the Maine Education Assessment tests at grades 4, 8, and 11, we ask questions on ecology and environment. These questions are developed or approved by a teacher-based advisory committee. Students routinely do poorly on this section, leading us to say that ideas seem to be taught piecemeal or in isolation . . . By testing ecology and environment in these tests, we have informally encouraged these topics . . . We have a very active Project Learning Tree chapter here . . . and an active Maine Energy Education Program. The Maine Audubon Society has an NSF grant for teacher training in natural history, which is a popular K-12 program . . . Elementary teachers feel overburdened already, and will infuse (environmental topics) if time and their interest allow . . . Some secondary schools have environmental science courses, but most do not. Maine does not specify which sciences students must take to satisfy their two-credit graduation requirement . . .

Gary Heath, *Maryland Department of Education:* EE is addressed as a major goal in state curriculum frameworks for science and social studies, as well as

EE. The frameworks provide direction for schools as they develop their curricula . . . Unfortunately, just because it's in the curriculum doesn't mean that EE is taught, especially at the elementary level . . . Everything, including EE, gets a language arts slant in elementary schools . . . In secondary schools, EE is the focus in courses such as ecology, environmental science, and aquatic biology, and a major emphasis in biology, earth science, and general science. Some infusion of EE takes place in social studies, but it is spotty, dependent on teacher . . .

John F. Reynolds, *Greater Springfield (MA) Regional Education Center:* Massachusetts does not provide a state curriculum or a required course list. Local decisions determine course structure. State tests are now promoting science education in elementary schools, and interest in science is increasing.

Mozell P. Lang, *Michigan Department of Education:* Environmental Education curriculum is not mandated; therefore, each district's program would vary . . . In secondary schools, EE would be taught as part of a biology, general science, S-T-S/chemistry, physics, or social studies course . . . Recommendations (with respect to the inclusion of EE in school curricula) are made in the *Michigan K-12 Program Standards of Quality,* and in the *Essential Performance Objectives for Science Education.*

Nancy I. Brown, *Mississippi Department of Education,* and **Jane W. Lusk,** *Mississippi Science Teachers Association:* Certain environmental topics are mandated in the state science curriculum, but this is not extensive . . . The schools on the Gulf Coast have courses in marine biology, and some schools also teach ecology courses . . . Most schools would teach any environmental materials by inclusion in other content areas, such as biology . . .

Robert M. Taylor, *Missouri Department of Education:* We have a good program, but find that we need to keep working at it . . . We cooperate very closely with the Departments of Natural Resources and Conservation . . . (We use) required core competencies and key skills, in science and physical education, on the Mastery Management Achievement Tests (MMAT). Also, (we have the advantage of the) excellent work of the Missouri Department of Conservation educational consultants and outdoor skill specialists . . . The Department of Conservation provides monthly lesson plans, booklets, wall charts, etc., to all Missouri schools . . . (In terms of policy) EE is considered a major thread or element which goes through the total curriculum . . .

Bob Briggs, *Montana Office of Public Instruction:* (With respect to policy), elementary schools in Montana are required to teach Conservation/Ecology, but no conditions are imposed.

Ron Gutzman, *Nevada Department of Education:* State statutes require environmental education to be included in the curriculum of all elementary and secondary schools of the state . . . Certainly the most used programs (in elementary schools) are Project WILD and Project Learning Tree; I assume that activities are picked from them and similar packages and presented as individual units . . . (In secondary schools) EE takes place in science classes . . . In Nevada, there is a recently formed Natural Resources Education Council with Northern and Southern Chapters. These councils support all education efforts that deal with the environment.

William B. Ewert, *New Hampshire Department of Education:* State board policy recommends that schools include environmental education in all appropriate curriculum areas.

B. K. Graham, *New Mexico Department of Education:* At one time it was specific in our standards that EE be part of every student's program. We have lost that, and nothing has replaced it . . . A fairly high percentage of teachers in New Mexico have been trained in Project WILD, not so many in Project Learning Tree.

Barry W. Jamason, *New York State Department of Education:* We have incorporated an environmental review into all syllabus revisions. To the extent (considerable) that these syllabi drive the achievement, program, competency, and Regents examinations, these objectives included in the revisions increasingly account for EE instruction . . . We offer an *Environmental Syllabus*, 10-12, which can be used for ½ unit elective credit in either science or social studies . . . Education law requiries that instruction/activity be provided on or around the mandated observance of Conservation Day, re: "trees, shrubs, fish, wildlife, soils, and water." Further, the law says that the Commissioner of Education "may prescribe, from time to time, a course of exercises and instruction in the subjects . . . (named above)."

Clinton L. Brown, *North Carolina Department of Public Instruction:* Environmental education is infused into other sciences, and separate from all other courses . . . EE concepts are part of the state standard course of study and are to be taught. Concepts are included in statewide testing in grades 3, 6, 8, and biology . . . Specific courses in EE are infrequent.

John Hug, *Ohio Department of Education:* Environmental education is such a broad term that I would have to say that 100% of Ohio schools and 100% of K-12 guides include some EE . . . Energy and resource conservation is required in Ohio schools . . . A substantial number of Ohio (secondary) schools offer an elective science course usually entitled "Environmental Science" . . . Social studies educators nationally and in Ohio are writing about and encouraging the teaching of "science-related social issues" at all grade levels, K-12. These issues are 95% EE . . . Science educators nationally and in Ohio are writing about and encouraging the teaching of "Science/Technology/Society" activites (issues) in all grades, K-12. These issues are 95% EE . . . Industrial technology educators nationally and in Ohio are writing about and encouraging teaching about "technological literacy." Some of these issues are EE.

Dean Steinhart and **John J. McDermott,** *Pennsylvania Department of Education:* Environmental education is required to be taught each year, K-12. No time guidelines are specified. In the secondary schools, each student is required to have one semester of EE.

Padgett Kelly, *Tennessee Department of Education:* EE objectives are in the state guides for several subject areas—science, social studies, biology, and health. A good basis for EE would exist if teachers used the guides to drive their teaching, instead of the textbook. Usage of these guides is increasing . . . Project CENTS is using Project

ERIC®

ERIC CLEARINGHOUSE FOR SCIENCE, MATHEMATICS AND ENVIRONMENTAL EDUCATION
1200 Chambers Road
Columbus, Ohio 43212

A JOINT PROJECT OF THE OFFICE OF EDUCATIONAL RESEARCH AND IMPROVEMENT and THE OHIO STATE UNIVERSITY

This newsletter was prepared pursuant to a contract with the Office of Educational Research and Improvement, U.S. Department of Education. Contractors undertaking such projects under government sponsorship are encouraged to express freely their judgment in professional and technical matters. Points of view or opinions, however, do not necessarily represent the official views or opinions of the Office of Educational Research and Improvement.

Patricia E. Blosser
Bulletin Editor

WILD, Project Learning Tree, and the CLASS Project, along with other materials, to aid teachers in EE.

Barbara ten Brink, *Texas Education Agency:* Texas schools must comply with Texas Education Code 21.101, which lists the skills, processes, and content to be taught in 13 content areas, K-12. Science essential elements list environmental topics K-6; life science and earth science in Grades 7-8 list environmental topics; and Grades 9-12 courses either list environmental essential elements, and/or students take environmental science as one of their two science courses.

R. LaMar Allred, *Utah State Office of Education:* EE is most commonly infused into the secondary science curriculum. The most common science courses accommodating EE are our two new S/T/S courses—Physical-Earth Science and Biological-Earth Science.

George Tanner, *Vermont Department of Education:* (For elementary schools), the state suggests integration; EE is ¼ of the suggested (not mandated) science framework for grades K-8 . . . (In secondary schools), EE is most commonly part of general science and life science programs. A few schools (10-15%) list environmental science as a course offering . . . About 30 districts use Chapter II funds to purchase contracted services in environmental education from private providers, which utilize a broad base of parent volunteers.

James C. Firebaugh, *Virginia Department of Education:* The state science framework incorporates environmental science objectives at all grades, K-12. All public schools in Virginia are responsible for implementing these objectives . . . As elementary schools offer an integrated curriculum, environmental topics overlap the specific content areas. For example, many environmental activities meet objectives in language arts, social studies, and science at the same time . . .

Tony Angell and **David Kennedy,** *Washington State Office of the Superintendent of Public Instruction:* The Goals and Guidelines (for Washington State) emphasize the interdisciplinary nature of EE. Therefore, objectives and learning strategies are written in a manner which encourages this approach. Our curriculum was developed with this in mind . . . (In secondary schools), EE is infused largely through science, social studies, and language arts . . . Our agency supports the Common Schools, which are mandated by law to instruct in "science with special reference to the environment," and the "worth of kindness to all living creatures and the land." Furthermore, each school district is mandated by law to offer all "required courses for a high school diploma . . . and shall provide an opportunity for high school students to take at least one course in the following areas of study . . . (which includes environmental education)" . . . Over the past five years, there has been an enormous increase in environmental education by agencies other than the Office of Public Instruction . . . there is an "infusion" through 4-H, hunting clubs, Scouts, YMCA, and the like. There is no particular requirement to maintain objectivity of content or provide evaluation of results.

David C. Engleson, *Wisconsin Department of Public Instruction:* I am certain that all districts do something (in EE), but it varies greatly from district to district. By September 1988, school districts will have to incorporate EE into the curriculum plans for all areas, with the greatest emphasis in art, health, science, and social studies . . . To many educators, teaching "units" is "infusion," but I would call it "insertion," and consider it as separate from the rest of the curriculum as a special course would be. To me, "infusion" means that EE is built into the teaching of just about everything. We are striving for "infusion" of the latter sort in Wisconsin, but I am afraid that most teachers use a unit approach . . . We have about 70 separate high school courses in environmental studies. As we promote infusion of EE throughout the curriculum, we will not discourage such courses, but will try to encourage teachers involved to make them much more issue-oriented than they are currently.

Survey Generalizations

Drawing generalizations from a survey such as the one reported above is chancy, but it is apparent that actual practice with respect to inclusion of environmental topics in the curricula of elementary and secondary schools of the United States is through infusion in more established areas of study. As might be expected, elementary schools which include environmental topics in their curricula operate almost entirely on the infusion model; this probably reflects the organizational patterns of elementary schools in terms of self-contained classrooms and significantly less rigidity in time frames, in comparison to secondary schools. Though there are occasional separate course offerings in environmental topics at secondary levels, their numbers do not suggest any large movement in the direction of "separateness" as opposed to "infusion."

Respondents to this survey have indicated that infusion is generally accomplished in association with science curricula in both elementary and secondary schools, though social studies has been identified as a host content area in several cases, and other curricula in a few. Differentiation between "infusion" and "inclusion," as described by Engleson (above), was not addressed by this survey.

The reported close association of environmental topics with science curricula may be reflective of a "science bias" (as opposed to a "social studies bias") occasioned by other professional responsibilities of the respondents, many of whom are also science education specialists; that is, a similar survey conducted among social studies specialists representing the state education agencies might reasonably be expected to report more significant relationships between environmental topics and social studies education than has been found through this survey.

Organization of the Symposium

The purpose of the survey of the state education agencies reported above was to gather baseline data as to current practice with respect to how environmental education fits into K-12 curricula in the United States. The symposium provided an opportunity for 14 presentors, with perspectives ranging from practical to philosophical, to discuss a range of options for incorporation of environmental education in K-12 school curricula, with "infusion" and "separate subject" suggested as the extreme positions, though not necessarily the only ones. The purpose of the symposium was not to seek consensus or arrive at a recommendation, but to consider the ramifications of a range of possibilities.

Brief summaries of the 14 papers, excerpted from Paul Brandwein's introduction to the symposium report (Disinger, 1987), are presented below. Complete texts of each are contained in the symposium report volume.

Chris Buethe, *Indiana State University,* Terre Haute, stresses that the "principal teachers of values should be the ones who are most concerned with environmental education." Thus, Buethe advocates "infusion by those who can, and most want to do the job." He suggests evaluating outcomes on the basis of individual and societal behaviors over a sufficient time period; then, if infusion is seen as failing, "a separate course for grade 8, simply called Earth."

Cheryl Charles, *Director, Project WILD,* insists that there is agreement that "environmental and conservation education is not a visible priority in

public schools," and suggests that the power in determining what is actually to be taught lies with the individual classroom teacher, building principal, local school board, and parents. Thus, she makes a case for programs designed to stand alone, which can be "infused into existing curricula." She recognizes a number of limitations of this approach, but argues that it is both philosophically appropriate and realistic, providing evidence that these approaches work.

David C. Engleson, *Wisconsin Department of Public Instruction,* Madison, offers a personal concept of what environmental education should be, as expressed in Wisconsin's *Guide to Curriculum Planning in Environmental Education,* of which he was principal author. Wisconsin standards call for sequential plans in all curriculum areas, with the incorporation of environmental education objectives into all plans—and thus, total infusion.

William F. Hammond, *Lee County Schools,* Florida, takes an analytical view of insertion or infusion. In analyzing the two he finds benefits in both, but notes the possibility of hybridization. Hammond presents a set of "key operating concepts" that guide him in "considering the totality of relationships that define the system as an integrated whole;" his aim is "long-term sustenance" of a significant body of knowledge, attitudes, skills, and of a total view of the curriculum. His ideal is not only "a holistic program which infuses its instructional goals and objectives in every class, in every subject, every day," but also "a comprehensive program that consists of discrete courses" and in-depth units of study which become the responsibility of a variety of classes.

Paul Hart, *University of Regina,* Saskatchewan, urges the need to develop a view why environmental education has followed its particular course of evolution. He argues that a significant paradigm shift is about to emerge, and posits that environmental educators cannot settle on either a single or a dual approach; the problems of the world are multifaceted, so educators must reflect this mode and "must continue a multifaceted approach to educational change." Hart concludes that "environmental education is an idea that is very close to achieving the critical mass to propel it into educational significance;" the goal is environmental literacy. He posits, as the critical problem, the need for education to direct its attention to education of teachers and the professional development of practicing teachers—all teachers.

Jerry Hodge, *Boyne River Natural Science School,* Ontario, insists that environmental education "should be consistent with the philosophical dimensions" of how the environment is understood by those in the field. He admires Project WILD and Project Learning Tree as examples of curricula that are balanced; he comes down hard on the side of integration, wholeness, and balance.

Harold R. Hungerford, *Southern Illinois University,* Carbondale, provides a carefully constructed comparison of two options: an investigative skills approach (developing in students the skills involved in the investigation and resolution of issues) and a case study approach (an issue case study of a single environmental issue, such as acid rain), as significant components of environmental education. He analyzes, then interprets, how these two methodologies can permeate the curriculum in infusion, insertion, integration. Thus, Hungerford sees problem-finding and problem-solving, "in-depth issue investigation," as central to environmental education. He wishes to change student behavior; thus, "we must attend to our goals initially and our curricular strategies secondarily."

Louis A. Iozzi, *Rutgers University,* New Jersey, summarizes an eclectic view; he considers that "whether environmental education is included in the curriculum as a separate subject, or if it is integrated and taught as part of another subject normally found in the schools . . . it (must) be taught in an interdisciplinary manner." Iozzi points up the critical lesson that the "body of literature sheds very little light on our symposium question," but notes that decisions on vital issues do not always depend on rigorous research. He insists that "environmental concepts appropriate to the discipline must be actually written into the curriculum to insure that over the course of the child's schooling, he or she receives a full environmental schooling."

Milton McClaren, *Simon Fraser University,* British Columbia, argues the advantages and disadvantages of both infused and mandated programs, noting that "either option has its strengths and its weaknesses." He posits that "successful curriculum implementation, whether of infused or mandated programs, depends on a social transaction with the teacher, a transaction in which the teacher is given an opportunity to participate, to become a co-developer as well as a user of the program." Thus, the teacher becomes a part of a team with a "sense of common, valuable purpose."

Ian Robottom, *Deakin University,* Victoria, Australia, states: "While I recognize the strong philosophical justification of environmental education as diffusion, I believe I have seen more 'successful' EE provision in the form of separate subjects. By 'success' here, I mean in terms of adherence to the critical, politicized prescriptions of EE emanating from the UNESCO EE program. When infusion is attempted, I have seen many instances of what I could call 'solicitous surrender.'" Thus, Robottom does not wish to abandon the "critical political edge" of environmental education whether or not the models are "infusion" or "insertion" of subject matter.

Peter A. Rubba Jr., *The Pennsylvania State University,* University Park, differentiates Science/Technology/Society and Environmental Education issues; he sees S/T/S issues as being of a more extended and covert nature. Rubba favors inclusion of societal issues of the EE flavor, investigative and action units, into the middle-junior and secondary science curriculum. He argues that it is conceivable that EE and S/T/S are in the position of subsuming each other, and points out that it doesn't really matter as long as it is done.

Rudolph J. H. Schafer, *California Department of Education,* Sacramento, follows another route; he suggests vectors (the "shaggy dogs of curriculum") that may be used to carry EE issues into the curriculum. His propositions lead to the inference that the understanding of bureaucracy and the policies and politics of curriculum in decision-making bodies are useful tools in advancing proposals and projects.

Bob Samples, an independent scholar, uses a different approach, pointing out that learning is a matter of the ecologies that are embraced in the brain-mind system. Because environmental education is devoted to both the cultural experience of mediated closed systems and open systems, he argues that it must be open to both. The dilemma? "On one hand, we honor the universe of mediated experience as organized by our cultural biases, and on the other we are exposed to the unmediated dominion of natural systems where the mind must create reference;" thus, "the whole learner is not honored when either is ignored."

Kay Monroe Smith, *Loyola University of Chicago,* brings the propositions of educational research to the discussion, using Tyler's four imperatives of curriculum development to analyze EE curricular thrusts. She notes that this approach is congruent with the definition of environmental education as education "about the environment, for the en-

vironment, in the environment." Smith's paper can serve as a basis for valid consideration by curriculum specialists who are confronting the question, "Why, How, Where, When" environmental education?

In Summary . . .

Both the survey and the symposium described above offer ample evidence that the posed question of how environmental education "fits" into school curricula is more complex than it might appear; a range of possible positions and mechanisms are possible. The evidence above and elsewhere suggests that infusion is the more popular method, in terms of practicality; there is greater likelihood of finding space for environmental topics in school curricula if they can be associated with in-place curricula, rather than carving out space for new ones.

Nonetheless, many mechanisms for fitting environmental education into school curricula are in place, and successfully so. Conversely, all inclusion mechanisms are open to criticism; it appears that intelligent application bears a greater relationship to effective environmental education than does any particular mechanism of inclusion.

REFERENCE

Disinger, John F., compiler-editor. *Trends and Issues in Environmental Education: EE in School Curricula.* Columbus, OH: ERIC Clearinghouse for Science, Mathematics, and Environmental Education, 1987. SE 048 890.

Prepared by:
John F. Disinger,
Associate Director for Environmental Education, ERIC/SMEAC

ERIC CLEARINGHOUSE FOR SCIENCE, MATHEMATICS, AND ENVIRONMENTAL EDUCATION

Dr. Robert W. Howe
Director

Dr. Stanley L. Helgeson
Associate Director,
Science Education

Dr. Marilyn N. Suydam
Associate Director,
Mathematics Education

Dr. John F. Disinger
Associate Director,
Environmental Education

Dr. Patricia E. Blosser
Associate Director,
Administration & User
Services

Dr. Margaret Kasten
Mathematics Education

Mrs. Linda Shinn,
Administrative Assistant

ERIC® Clearinghouse for Science, Mathematics
and Environmental Education
The Ohio State University
1200 Chambers Road, 3rd Floor
Columbus, OH 43212
4030-720391

NONPROFIT ORG.
U.S. POSTAGE
PAID
COLUMBUS, OHIO
PERMIT NO. 711

ADDRESS CORRECTION REQUESTED